Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte H. RANDY CARTER

Appeal No. 1997-2674
Application No. 08/266,809

ON BRIEF

Before JOHN D. SMITH, OWENS, and DELMENDO, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 6, 7, 9, and 10, which are all of the claims pending in this application.

Claim 9 is illustrative of the claims on appeal and is reproduced below:

> 9. A method for injecting NO_x inhibiting liquid reagent into a boiler having boiler gas flowing

therein in a direction of flow, the boiler including an opening, the method comprising:

mounting a conduit having a nozzle, the conduit being activable for injecting NO_x inhibiting reagent, and mounting the conduit such that the conduit and nozzle are movable into the gas in the boiler through the opening and movable out of the gas and out of the opening;

sensing a temperature of the gas in the boiler;

when the temperature of the gas is sensed to be within a selected range, activating the conduit to insert the nozzle into the gas through the opening and activating the conduit to spray reagent through the nozzle into the gas; and

when the temperature of the gas is sensed to be outside the selected range, activating the conduit to withdraw the nozzle from the gas and out of the opening, and deactivating the conduit so that no reagent is supplied through the conduit to the nozzle.

The subject matter on appeal generally relates to a method for injecting NO_x inhibiting liquid reagent into the flue gas of a utility or industrial type boiler in order to reduce the emission of NO_x (specification, page 3, lines 2-5). The appellant states that the main goal of the invention is to enable NO_x liquid reagent to be used in an appropriate temperature window at the most efficient location within the flue gas passageways in order to maximize pollution control

efficiency (*id*.). According to the appellant, the invention achieves this objective by employing a conduit and spray nozzle that is normally retracted from the harsh environment of the boiler and inserted into the flue gas passageways only when a temperature sensor, operatively located at the conduit entrance to the flue gas passageway, senses the optimum temperature for reagent injection (*id*.).

As evidence of obviousness, the examiner relies upon the following prior art reference:

Burton	4,842,834	June 27, 1989

Claims 6, 7, 9, and 10 stand rejected under 35 U.S.C. § 103 as unpatentable over Burton (examiner's answer, pages 4-7).

We have carefully reviewed the entire record, including all of the arguments and evidence advanced by both the examiner and the appellant in support of their respective positions. This review leads us to conclude that the aforementioned § 103 rejection is not well founded. Accordingly, we reverse. The reasons for our determination follow.

Burton teaches a process for reducing the concentration of nitrogen oxides, or other pollutants, in an effluent from the combustion of a carbonaceous fuel (column 3, lines 44-47). According to Burton, the apparatus **20** used to carry out the process comprises a probe **21** comprising: (i) a supply conduit **24** for supplying and injecting a treatment fluid **28**, such as a solution, into a high temperature environment, such as the effluent stream of a utility boiler **10**; and (ii) an atomization conduit **30** for supplying an atomization fluid **32** (figures 1-3; column 3, lines 61-66; column 6, lines 19-21). Burton further states that the supply conduit **24** is coaxial with and disposed within atomization conduit **30** and that it is axially slidable within atomization conduit **30** so that end portion **24**a of supply conduit **24** can extend beyond the end **31** of atomization conduit **30**, as illustrated in figures 2 and 3, or portion **24**a can be retracted into atomization conduit **30**, as illustrated by the phantom lines in figure 3 (column 6, lines 39-46; column 6, lines 54-58). Regarding the purpose of the axial slidability of supply conduit **24**, Burton teaches that this feature facilitates the independent control of both

atomization (i.e., droplet size) and dispersion of fluid **28** throughout effluent **60** (i.e., distance of injection) and that it can be provided by suitable means known to the skilled artisan, such as by compression fitting **26** (column 6, lines 46-49; column 6, lines 59-61).

Burton further describes that the effluent flue conduit additionally has a thermocouple for temperature measurement (column 8, lines 7-9). Also, Burton states that the treatment fluid **28** should be dispersed uniformly within effluent stream **60** at a point where effluent **60** is at a temperature effective for pollutant reduction employing the desired additive at a particular concentration and that, in the exemplary case of droplets of an aqueous urea solution, the temperature will be above about 1300EF with enhancers (column 5, lines 16-24).

In comparing Burton's method against the subject matter of appealed claim 9, we determine that Burton does not teach the following element of appealed claim 9: ". . . when the temperature of the gas is sensed to be within a selected range, activating the conduit to insert the nozzle into the gas through the opening and activating the conduit to spray

reagent through the nozzle into the gas; and when the temperature of the gas is sensed to be outside the selected range, activating the conduit to withdraw the nozzle from the gas and out of the opening, *and deactivating the conduit so that no reagent is supplied through the conduit to the nozzle*" (emphasis added).

Recognizing the differences between the applied prior art and the subject matter of the appealed claims (answer, pages 5 and 6), the examiner alleges as follows:

> One skilled in the art knowing that Burton emphasizes adding nitrogen oxide inhibiting liquid reagent (28) only when conditions are proper for pollutant reduction (i.e., temperature of boiler gas (60) above about 1,300EF) and known [sic, knowing] that Burton at least provides a means to measure the temperature of boiler gas (60) during operation (i.e., the thermocouples), would have been motivated to monitor the temperature of boiler gas (60) and activate supply conduit (24) to add or stop the addition of nitrogen oxide inhibiting liquid reagent (28) in response to the monitored temperature where the addition occurs if the temperature of boiler gas (60) is above about 1,300EF and where no addition occurs when the temperature of boiler gas (60) is outside of this temperature range. [Answer, pp. 5-6.]

Further, the examiner states:

> With respect to moving supply conduit (24) out of boiler gas (60) and out of opening (31) when

> supply conduit (24) is not adding nitrogen oxide inhibiting liquid reagent (28), Burton teaches that it is important in the art of treating boiler gases that the temperature in the boiler gas not destroy the structural integrity of nozzles and their support
> (col. 2, lines 34-36), and Burton teaches the atomization conduit (30) (i.e., the housing surrounding supply conduit (24)) is made from a heat resistant material (col. 6, lines 19-25). Burton, also teaches that supply conduit (24) is made of a heat resistant material (col. 3, line 66, to col. 4, line 2). Thus, it is considered important to Burton that the temperature of the atmosphere of boiler (10) not damage the integrity of supply conduit (24). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have moved supply conduit (24) out of boiler gas (60) and out of opening (31) when supply conduit (24) is not adding nitrogen oxide inhibiting liquid reagent (28) (i.e., to have retracted supply conduit (24) completely within atomization conduit (30)) to prevent supply conduit (24) from contacting the atmosphere of boiler (10) for extended periods of time when such is not in use where the material of atomization conduit (30) will add further heat protection for supply conduit (24). This will have the benefit of extending the life of supply conduit (24) where Burton desires to prevent premature heat damage to nozzles and their supports and recognizes this damage to be a problem. [Answer, pp. 6-7.]

We cannot agree. Under 35 U.S.C. § 103, the examiner carries the initial burden of establishing a *prima facie* case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984).

Here, we determine that the examiner has not met this burden because there is no teaching or suggestion in Burton that supports the examiner's rejection. Specifically, Burton does not teach or suggest to a person skilled in the art to measure the temperature and to use this temperature information to activate supply conduit **24** for spraying additive at certain temperatures and to *deactivate* the supply conduit **24** *so that no reagent is supplied through the conduit at all other temperatures as in the appellant's claimed invention*. At best, Burton might suggest using the temperature information to control the concentration of the additive or the size of the droplets being sprayed into the boiler (column 5, lines 25-52). However, this cannot result in the appellant's claimed process in which the spraying of additive is stopped altogether under certain temperatures.

While the examiner alleges that one of ordinary skill in the art "would have been motivated to monitor the temperature of boiler gas (60) and activate supply conduit (24) to add or stop the addition of nitrogen oxide inhibiting liquid reagent (28)" (examiner's answer, pp. 5-6), we find that such an

allegation is contrary to the actual teachings of Burton. In particular, Burton teaches that, in the most typical situation, the interior boiler **10** can be accessed only in the area of the flame **15** and at an area above the flame, where the temperatures at full load are typically within the range of about 2,050EF and above (column 5, lines 29-37). Additionally, Burton teaches that in the exemplary case of aqueous urea solution, pollutant reduction can occur at temperatures above about 1,300EF with enhancers and above about 1,550EF without enhancers (column 5, lines 20-24). No other evidence has been presented by the examiner to establish that additives other than urea would not be effective at the boiler temperatures disclosed in Burton. Given the disclosures in Burton, we see no reason why one of ordinary skill in the art would have been motivated to monitor the temperature to activate or deactivate supply conduit **24** in the manner as suggested by the examiner. That is, the examiner has not established the requisite factual basis upon which to conclude that a person of ordinary skill in the art would have found any incentive or suggestion in the prior art to monitor

the temperature for the purpose stated in the examiner's answer.

As to the retraction of supply conduit **24**, the examiner's rationale is equally untenable. The examiner states that it would have been obvious to a person of ordinary skill in the art to move supply conduit **24** out of the boiler gas **60** and out of opening **31** when supply conduit **24** is not adding nitrogen oxide inhibiting reagent **28** to prevent supply conduit **24** from contacting the atmosphere of the boiler **10** for extended periods of time and that, in doing so, the material of atomization conduit **30** would provide further heat protection for supply conduit **24** (examiner's answer, pp. 6-7). Again, however, there is no teaching or suggestion in Burton to support the examiner's rationale. Moreover, Burton teaches the use of other means, such as the use of heat resistant materials or a cooling fluid to counteract the high temperature in the boiler (column 3, line 66 to column 4, line 2; column 7, lines 49-53). The examiner has not pointed to, and we do not find any, evidence to indicate that a person of ordinary skill in the art would have been led to modify

Burton's process in the manner as suggested by the examiner in spite of Burton's teachings regarding the use of heat resistant materials or a cooling fluid to counteract the harsh environment in the boiler.

Under these circumstances, we determine that Burton would not have suggested the modification of Burton's process in the manner as proposed by the examiner. Because the examiner has engaged in impermissible hindsight reconstruction, we reverse the examiner's rejection under 35 U.S.C. § 103 of claims 6, 7, 9, and 10 as unpatentable over Burton. *W. L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983)("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.").

The decision of the examiner is reversed.

REVERSED

JOHN D. SMITH Administrative Patent Judge	)
TERRY J. OWENS Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
ROMULO H. DELMENDO Administrative Patent Judge	)

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